17 Claim 1

A communication device according to ~~one of claims 1 to 4~~, characterized by an excitation duty cycle (Tex/Tcar) and a resonance frequency detuning rate (dfres=fres/fcar–1) being substantially defined by:

$$(Tex/Tcar)[Q] = \frac{\mathrm{Sqrt}\left[1-\left(1-\frac{1}{Q}\right)^{\frac{1}{4}}\right]}{2\,\mathrm{Pi}\left(1-\frac{1}{Q}\right)^{\frac{1}{2}}\left(\frac{\mathrm{Sqrt}\left[1-\left(1-\frac{1}{Q}\right)^{\frac{1}{4}}\right]}{2\,\mathrm{Pi}\left(1-\frac{1}{Q}\right)^{\frac{1}{2}}}+\frac{3+\frac{2\,\mathrm{ArcSin}\left[\left(1-\frac{1}{Q}\right)^{\frac{1}{2}}\right]}{\mathrm{Pi}}}{4}\right)}$$

claim 1

6. A communication device according to ~~one of claims 1 to 5~~, characterised by a resonance frequency detuning rate (dfres=fres/fcar-1) being substantially defined by:

$$dfres[Q]=0.5\left[\frac{\mathrm{Sqrt}\left[1-\left(1-\frac{1}{Q}\right)^{\frac{1}{4}}\right]}{2\,\mathrm{Pi}\left(1-\frac{1}{Q}\right)^{\frac{1}{2}}}+\frac{3+\frac{2\,\mathrm{ArcSin}\left[\left(1-\frac{1}{Q}\right)^{\frac{1}{2}}\right]}{\mathrm{Pi}}}{4}-1\right]$$

claim 1

7. A communication device according to ~~one of claims 1 to 6~~, characterized by a discontinuity in the slope of the signal occurring in the resonance circuit during the resonation periods at the start of the excitation periods.

8. A communication device according to claim 7, characterized by a DC level shift causing said discontinuity to occur.

9. A communication device according to ~~one of claims 1 to 8~~ Claim 1, characterized in that the excitation circuit comprises a controllable switching device serially arranged with the resonance circuit between first and second terminals of a voltage supply source and having a control terminal coupled to the input of the power amplifier for periodically supplying an excitation voltage signal to the resonance circuit, phase and/or frequency coupled with the modulated carrier signal circuit.

10. A communication device according to claim 9, characterized in that the controllable switching device comprises a switch resistance serially arranged with the resonance circuit between the first and second terminals of said voltage supply source and being varied from a maximum resistance value to a minimum resistance value and vice versa to smoothen transients of said excitation voltage signal increasing above a threshold voltage within the excitation periods.

11. A communication device according to claim 10, characterized in that the controllable switching device comprises a MOS transistor having its drain source path serially coupled to the resonance circuit being controlled to vary the switch resistance stepwise.

12. A communication device according to ~~one of claims 9 to 11~~ Claim 1, characterized by amplitude modulation means for modulating the amplitude of the supply voltage between the first and second terminals of the voltage supply source with modulation signal dependent envelope amplitude variations of the modulated high frequency carrier signal.

13. A communication device according to ~~one of claims 1 to 8~~ Claim 1, characterized in that the excitation circuit comprises a charge pump supplying an excitation current signal, phase and/or frequency coupled with the modulated carrier signal circuit having smooth transients between a minimum and a maximum current level and incraesing above a threshold curent level within the excitation periods.

14. A communication device according to claim 13, characterized in that an output stage of the charge pump comprises a bipolar transistor, the collector emitter path thereof being serially coupled to the resonance circuit between first and second terminals of a supply voltage source.

15. A communication device according to ~~claim 13 or 14~~ claim 13, characterized by amplitude modulation means for modulating the excitation signal as well as a supply voltage coupled to the resonance circuit with modulation signal dependent envelope amplitude variations of the modulated high frequency carrier signal.

16. A communication device according to ~~one of claims 1 to 15~~ claim 1, characterized in that the resonance circuit input means comprise a pulse generator controlling the excitation circuit to modulate the excitation signal in its phase and/or frequency and/or envelope amplitude in correspondence with the modulated high frequency carrier signal.

17. A communication device according to ~~one of claims 1 to 16~~ claim 1, characterized by the resonance circuit having a resonance filter quality factor greater than 1.

18. A communication device according to ~~one of claims 1 to 17~~ claim 1, characterized by a balanced implementation of the excitation circuit and the resonance circuit.

19. A communication device according to ~~one of claims 1 to 18~~ claim 1, characterized in that the resonance circuit comprises a parallel RLC network, an inductor and resistor thereof being part of ~~the antenna means~~ an antenna device.

20. A communication device according to ~~one of claims 1 to 19~~ claim 1, characterized in that the resonance circuit comprises a parallel RLC circuit comprising an inductor provided with a tapped coupling to ~~the antenna impedance~~ an antenna device.

21. A communication device according to claim 20, characterized in that the inductor is provided with a further tap, coupled to the excitation circuit.

22. A communication device according to one of claims 1 to 21, characterized by said antenna means having narrow bandwidth.

23. High frequency power amplifier for use in a communication device according to ~~one of claims 1 to 19~~ claim 1, characterized by a resonance circuit part provided with antenna coupling means for completing the resonance circuit part to form said resonance circuit by coupling antenna means thereto.